

- 1 1. A recording head to read from a plurality of tracks on magnetic tape while
2 compensating for shrinkage or expansion of the magnetic tape, the recording head
3 comprising:
 - 4 a leading module comprising a plurality of leading read elements located at
5 spaced intervals along the length of the leading module;
 - 6 a trailing module comprising a plurality of trailing read elements located at spaced
7 intervals along the length of the trailing module; and
 - 8 the trailing module being offset with respect to the leading module, such that:
 - 9 selected leading read elements are substantially aligned with selected
10 tracks from the plurality of tracks, and
 - 11 selected trailing read elements are substantially aligned with selected
12 tracks from the plurality of tracks.
- 13
- 14 2. The recording head of claim 1, wherein the trailing module is fixed with respect to the
15 leading module.
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- 17 3. The recording head of claim 2, wherein the trailing module is rigidly attached to the
18 trailing module.
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- 20 4. The recording head of claim 1, wherein the trailing module is substantially identical to
21 the leading module.
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- 23 5. The recording head of claim 1, further comprising a plurality of leading write
24 elements, on the leading module, and a plurality of trailing write elements, on the trailing
25 module.
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- 27 6. The recording head of claim 1, further comprising a plurality of servos configured to

1 substantially align selected leading and trailing read elements with the plurality of tracks.

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3 7. The recording head of claim 6, wherein the plurality of servos align the selected
4 leading and trailing I/O elements using servo tracks on the magnetic tape.

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6 8. The recording head of claim 6, wherein the servos effectively measure the width of the
7 magnetic tape between servo bands on the tape.

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9 9. The recording head of claim 1, further comprising a controller configured to select the
10 selected leading read elements and the selected trailing read elements.

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12 10. The recording head of claim 1, wherein the leading and trailing modules are offset an
13 amount in the range of between 37% and 77% of the calculated maximum shrinkage and
14 expansion of the magnetic tape.

1 11. A method for reading data from a plurality of tracks on magnetic tape while
2 compensating for shrinkage or expansion of the magnetic tape, the method comprising:
3 providing a leading module comprising a plurality of leading read elements
4 located at spaced intervals along the length of the leading module;
5 providing a trailing module comprising a plurality of trailing read elements
6 located at spaced intervals along the length of the trailing module;
7 offsetting the trailing module with respect to the leading module;
8 aligning selected leading read elements with selected tracks from the plurality of
9 tracks; and
10 aligning selected trailing read elements with other selected tracks from the
11 plurality of tracks.

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13 12. The method of claim 11, further comprising fixing the trailing module with respect to
14 the leading module.

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16 13. The method of claim 12, further comprising rigidly attaching the trailing module to
17 the leading module.

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19 14. The method of claim 11, wherein the trailing module is substantially identical to the
20 leading module.

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22 15. The method of claim 11, further comprising providing a plurality of leading write
23 elements, on the leading module, and a plurality of trailing write elements, on the trailing
24 module.

1 16. The method of claim 11, further comprising:

2 recording, onto the magnetic tape, an initial width of the tape at the time of
3 recording;

4 reading, from the magnetic tape, the initial width;

5 measuring the current width; and

6 selecting the leading read elements and the trailing read elements in accordance
7 with a variation between the initial width and the current width.

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9 17. The method of claim 11, further comprising substantially aligning selected leading
10 and trailing read elements with the plurality of tracks using a plurality of servos.

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12 18. The method of claim 17, wherein substantially aligning further comprises aligning
13 the selected leading and trailing read elements using servo tracks on the magnetic tape.

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15 19. The method of claim 17, wherein substantially aligning further comprises effectively
16 measuring, with the servos, the width of the magnetic tape between servo bands on the
17 magnetic tape.

1 20. A system for reading data from a plurality of tracks on magnetic tape while
2 compensating for shrinkage or expansion of the magnetic tape, the system comprising:
3 a magnetic medium including a plurality of data tracks located at spaced intervals
4 along the magnetic medium; and
5 a data storage device including a recording head for reading and writing to and
6 from the data tracks, the recording head comprising:
7 a leading module comprising a plurality of leading read elements located
8 at spaced intervals along the length of the leading module;
9 a trailing module comprising a plurality of trailing read elements located at
10 spaced intervals along the length of the trailing module; and
11 the trailing module, being offset with respect to the leading module such
12 that selected leading read elements and selected trailing read elements effectively
13 align with the data tracks.

14
15 21. A recording head to read from a plurality of tracks on magnetic tape while
16 compensating for shrinkage or expansion of the magnetic tape, the recording head
17 comprising:
18 means for providing a plurality of leading read elements, at spaced intervals, in a
19 substantially linear arrangement;
20 means for providing a plurality of trailing read elements, at spaced intervals, in a
21 substantially linear arrangement; and
22 means for offsetting the leading read elements with respect to the trailing read
23 elements.

1 22. A method for reading data from a plurality of tracks on magnetic tape while
2 compensating for shrinkage or expansion of the magnetic tape, the method comprising:
3 providing a plurality of leading read elements spaced substantially linearly with
4 respect to one another and at predetermined intervals;
5 providing a plurality of trailing read elements spaced substantially linearly with
6 respect to one another and at predetermined intervals, the spacing of the trailing read
7 elements being substantially equal to the spacing of the leading read elements;
8 offsetting the leading read elements with respect to the trailing read elements;
9 reading selected tracks from the plurality of tracks with selected leading read
10 elements; and
11 reading other selected tracks from the plurality of tracks with selected trailing read
12 elements.